Service Manual for Knitting Machine

brother

MODEL KH-230

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I. Specifications

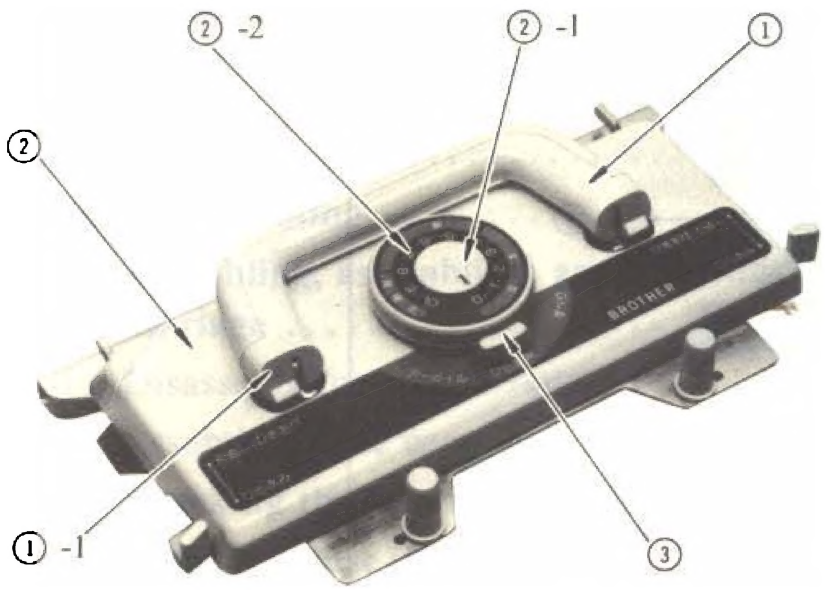
Pitch Stitch	9.0 m/m 110 stitches
Weight	9.9 kg
Dimensions	1,106 m/m × 201 m/m × 90 m/m (Length) (Depth) (Height)
Patterning Function	Tuck stitch Skip stitch Plating Intarsia knitting
Knit Leader	A knit leader can be attached. * Knit leader model KL—116 can be attached.
Yarn Feeder	Fixed type * Same system as the plating yarn feeder for intarsia and plating of punch card Knitter KH—860.
Needle Bed Comb	Fixed type
Others	Needles for KH—210, 220 types cannot commonly be used.

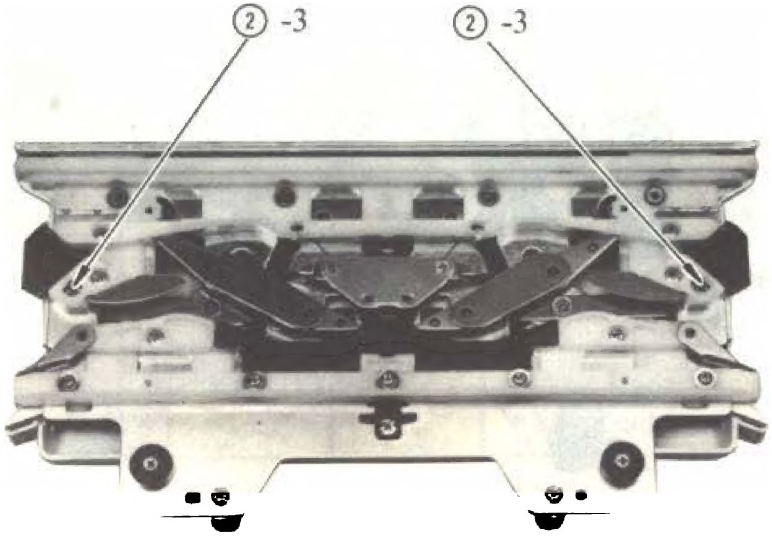
II Trouble shooting

Trouble	Cause	Remedy	Note
1. Carriage does not move easily.	(1) Carriage cam sliding part is out of oil.	(1) Oil needle butt and the side surface of stitch cam.	* See the instruction manual.
	(2) Needle bed sliding part is out of oil.	(2) Oil front and rear rails of body and front and rear feet of carriage.	
	(3) Sinker plate is in contact with comb teeth.	(3) Adjust sinker plate position.	* See the page 19.
	(4) Stitch dial is set too tight,	(4) Set stitch dial properly.	* See the instruction manual.
2. Knitting floats. (Floating stitches)	(1) Wrong fitting of sinker plate	(1) Fit sinker plate properly.	* See the instruction manual.
	(2) Too much gap between sinker plate and comb teeth	(2) Adjust sinker plater position.	* See the page 19.
	(3) Poor operation of needle latch.	(3) Replace needle.	* See the instruction manual.
	(4) Stitch dial is set too tight.	(4) Set stitch dial properly.	* See the instruction manual.
	(5) Fitting measurement of yarn feeder is wrong.	(5) Adjust fitting measurement of yarn feeder.	* See the page 19.
3. Lateral stripe is produced every second raw. (Stripe)	(1) Fiiting measurements of right and left stitch cams are uneven.	(1) Make adjustment with stripe adjuster plate.	* See the page 20.
4. Lateral stripe is produced here and there; not stitches neatly.	(1) Carriage operating speed is uneven.	(1) Operate carriage at constant speed.	
	(2) Poor yarn supply	(2) Regulate yarn supply of yarn tension unit.	* See the instruction manual.
5. Carriage sticks midway.	(1) Needle butt is bent.	(1) Replace needle.	* See the instruction manual.
	(2) Needle bed is damaged.	(2) Repair needle bed.	
6. Right and left knitted unevenly.	(1) Fiiting measurements of right and left comb are uneven.	(1) Adjust fitting measurements of comb.	* See the page 23.

III. Disassembling, assembling, and adjusting the carriage

1. DISASSEMBLING THE CARRIAGE





Names of parts

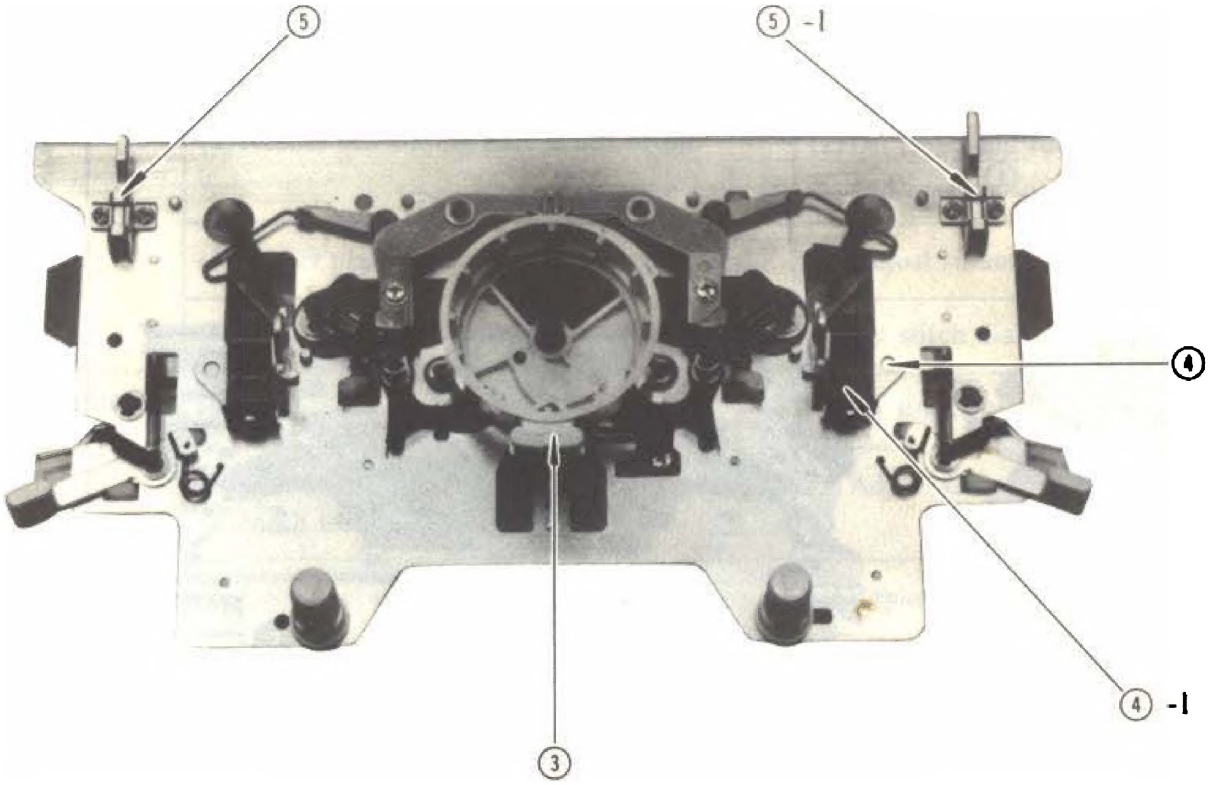
① Handle
①-1 Screw
② Carriage cover
②-1 Stitch dial cap
②-2 Stitch dial
②-3 Carriage cover screw
③ Pattern selector lever

1. Removing the carriage handle

Keep the carriage handle down and remove the two right and left handel screws. Then the handle can be taken off the carriage.

2. Removing the carriage cover

(1) Pull off the stitch dial cap upward.
(2) Remove a screw and detach the stitch dial presser.
(3) Pull off the stitch dial from the shaft.
(4) Remove two tapping screws of the carriage cover from the carriage rear.
(5) Remove the carriage cover, lifting the rear of the carriage cover with the pattern selector lever set to 'PLAIN' position.



Names of parts

③ Pattern selector lever
④ Handel setting base
④-1 Handle lock spring
⑤ Knit-leader tripper
⑤-1 Row counter tripper

3. Removing the pattern selector lever

Lift the pattern selector lever lightly by holding its periphery and turn it in the arrow direction —from the 'PLAIN' to 'PART' position— to remove it from the stitch dial shaft.

4. Removing the right and left handle setting base

(1) Loosen the handle lock spring fastening screws and remove right and left handle lock springs.

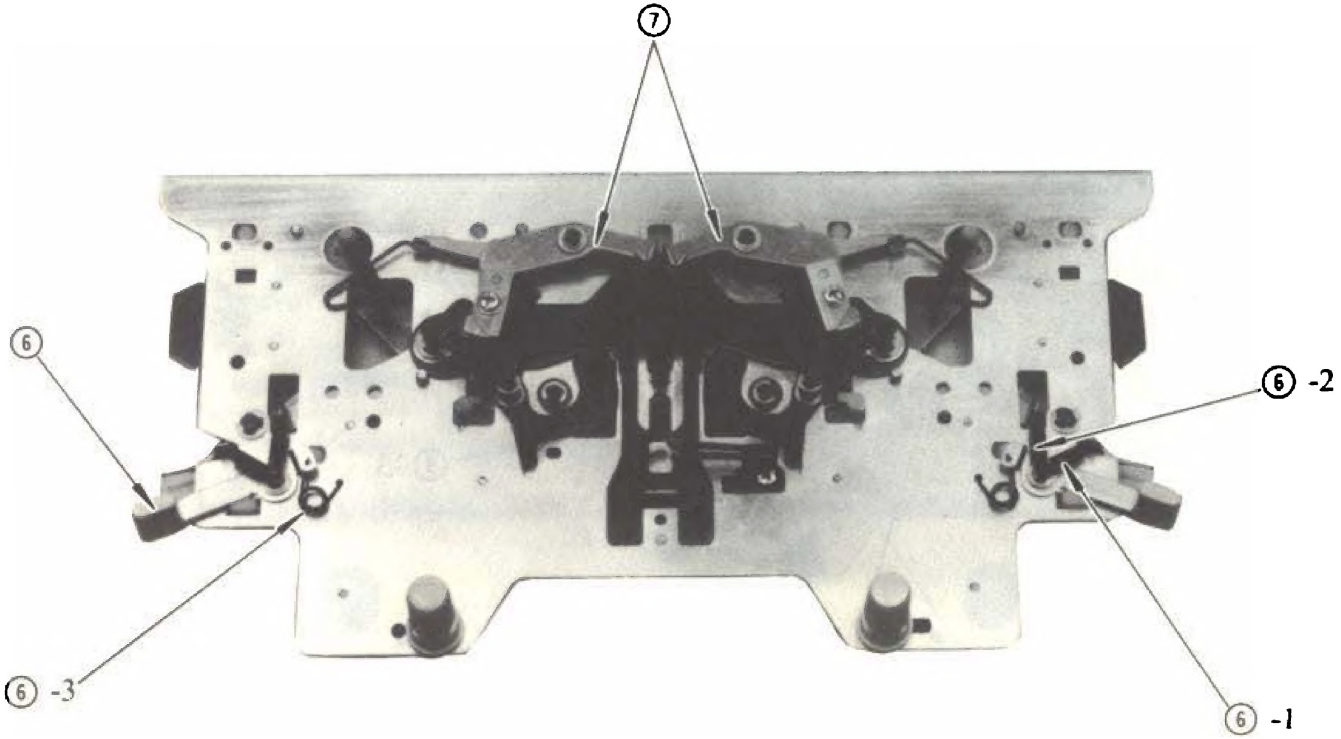
(2) Loosen the handle setting base fastening screws and remove right and left handle setting bases.

5. Removing the knit-leader tripper and row counter tripper

(1) Loosen the two knit-leader tripper fastening screws and remove the knit-leader tripper (small tripper).

(2) Loosen the two row counter tripper fastening screws and remove the row counter tripper (big tripper).

* **Tripper springs are provided under the knit-leader tripper and row counter tripper. Do not lose them.**



Names of parts

- ⑥ Holding cam lever
- ⑥-1 Holding cam spring
- ⑥-2 Intarsia knitting cam spring
- ⑥-3 H.C.L. spring
- ⑦ Shift levers for intarsia

6. Removing the right and left holding cam levers

(1) Remove the right and left holding cam springs and intarsia knitting cam springs from the holding cam and intarsia knitting cam shafts.

* **Take care not to damage the spring hook.**
* **Take care not to confuse the holding cam spring (short spring) with the intarsia knitting cam spring (long spring) in assembling.**

(2) Remove the right and left H.C.L. springs from the holding cam lever and carriage plate.

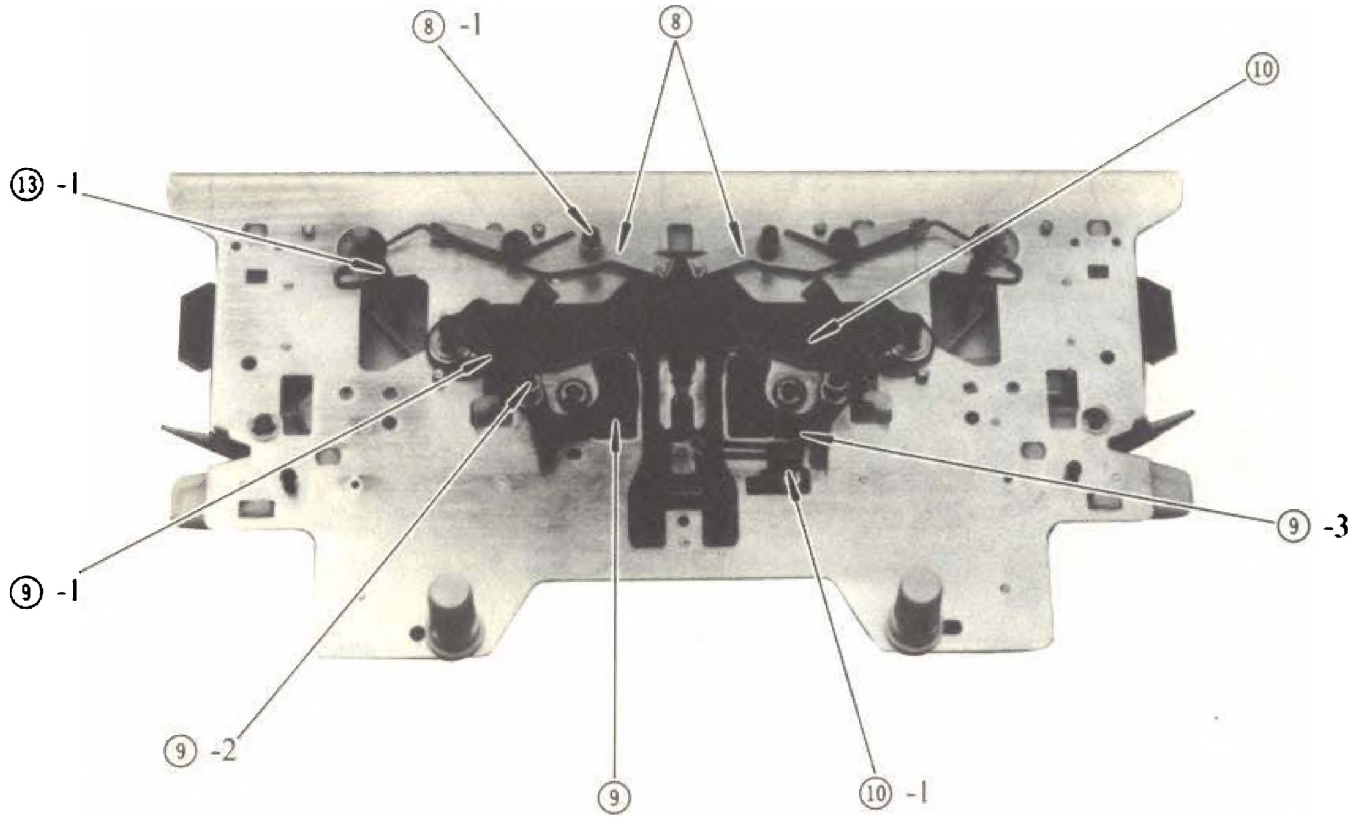
(3) Remove the snap rings (A41) and the washers (A40) of the right and left holding cam lever shafts.

(4) Detach the right and left holding cam levers from the holding cam lever shafts.

7. Removing the shift levers R and L for intarsia

(1) Remove the snap rings (A18) and the washers (A17) of the right and left rasing cam change plate axes.

(2) Detach the right and left shift levers for intarsia from the rasing cam change plate.



Names of parts

- ⑧ Rasing cam change plate
- ⑧-1 Spacer
- ⑨ Sub rasing cam change plate
- ⑨-1 Stitch cam guide plate spring
- ⑨-2 Sub change spring
- ⑨-3 Spring for sub rasing cam
- ⑩ Stitch cam guide plate
- ⑩-1 Stitch dial notch spring
- ⑬-1 Rasing cam change spring

8. Removing the right and left rasing cam change plates

(1) Remove the spacers from the right and left rasing cam change plate shafts.

(2) Remove the right and left rasing cam change plates from the rasing cam change plate shafts.

9. Removing the right and left sub rasing cam change plate

(1) Remove the right and left stitch cam guide plate springs from the sub rasing cam change plate shafts and the stitch cam guide plate shafts.

(2) Remove the snap rings (A25) of the right and left sub rasing cam change plate shafts and detach the right and left sub chang springs from the sub rasing cam change plates and the front foot of the carriage.

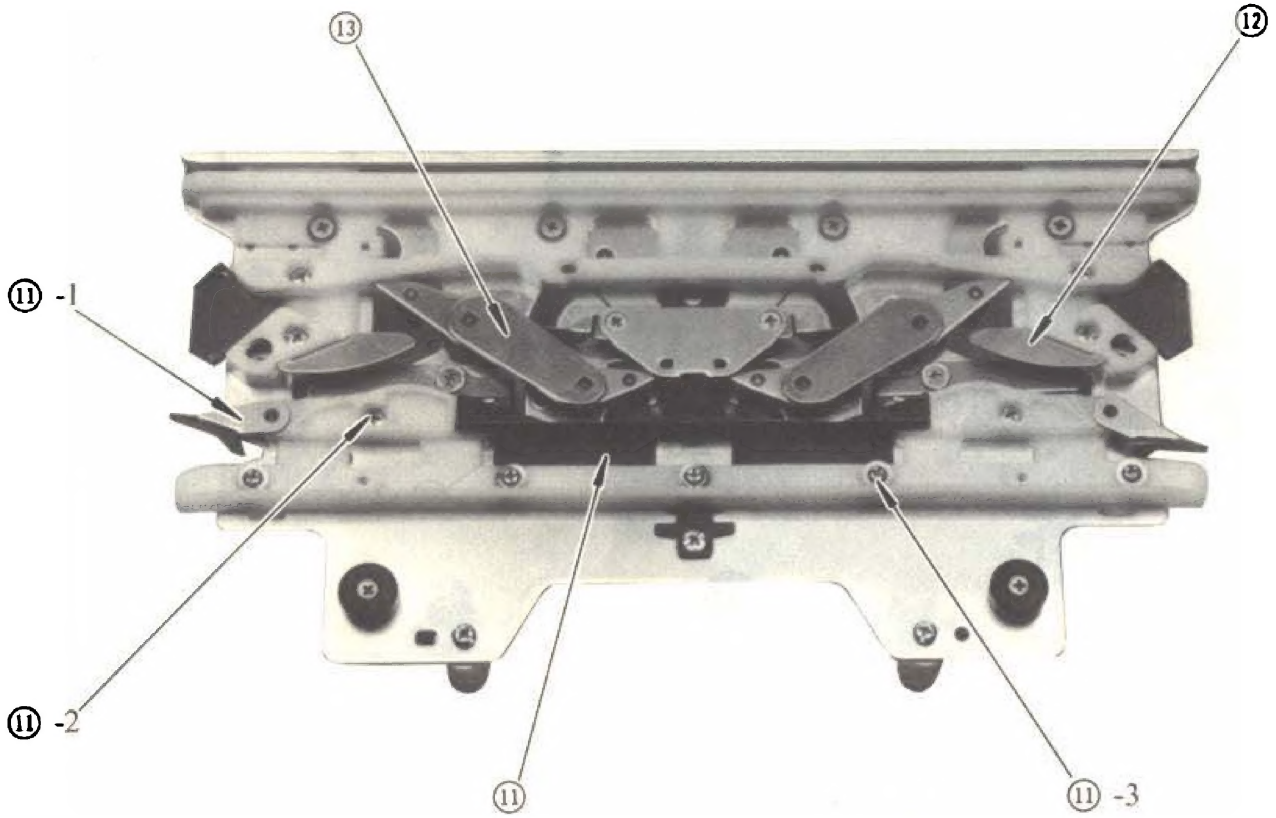
(3) Remove the right and left sub rasing cam springs from the sub rasing cam change plates and the sub rasing cam shafts.

(4) Remove the snap rings (A22) and washers (A21) of the right and left sub rasing cam change plate shafts and detach the right and left sub rasing cam change plates.

10. Removing the stitch cam guide plate

(1) Loosen the stitch dial notch spring fastening screw to remove the stitch dial notch spring.

(2) Remove the snap rings (A4) and washers (A3) of the right and left stitch cam guide plate shafts and detach the stitch cam guide plate.



Names of parts

- ⑪ Front foot
- ⑪-1 Holding cam
- ⑪-2 Front foot fastening screw A
- ⑪-3 Front foot fastening screw B
- ⑫ Intarsia knitting cam
- ⑬ Stitch cam

11. Removing the front foot and the right and left holding cams

(1) Remove the snap rings (A45) of the right and left holding cam shafts from the carriage front side and detach the right and left holding cams.

(2) Loosen the two front foot fastening screws A and the five front foot fastening screws B and remove the front foot.

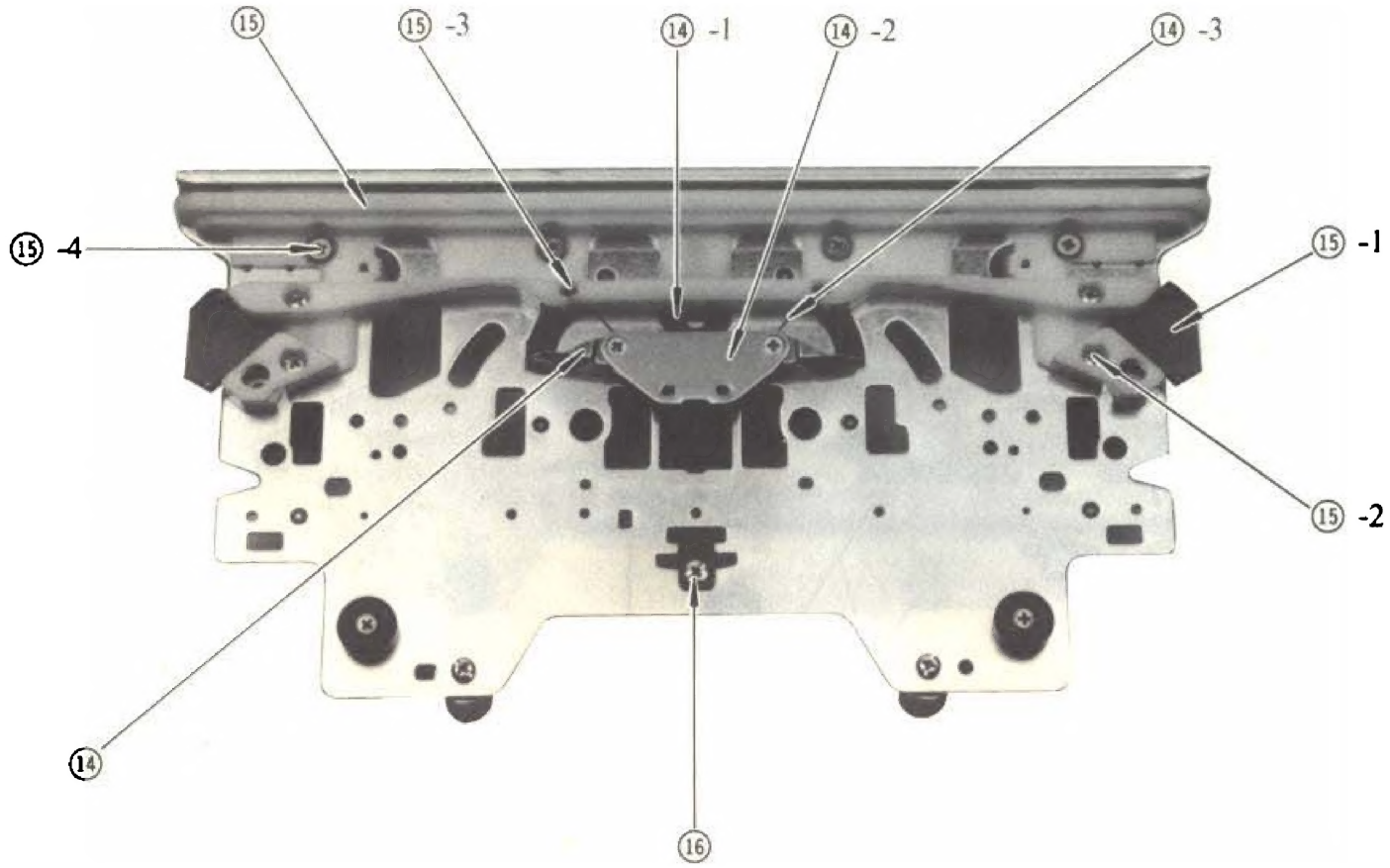
12. Removing the right and left intarsia knitting cams

Loosen the intarsia knitting cam fastening screws (stud screws) and remove the right and left intarsia knitting cams.

13. Removing the right and left stitch cams

(1) Remove the right and left rasing cam change springs from the rasing cam shafts and rear foot on the carriage front side. (See the page 6.)

(2) Remove the snap rings (A7) of the stitch cam shafts from the carriage front side and detach the right and left stitch cams.



Names of parts

⑭ Intarsia rasing cam
⑭-1 Operation plate for intarsia
⑭-2 Guide cam, M
⑭-3 Spring for intarsia rasing cam
⑮ Rear foot
⑮-1 Guide cam
⑮-2 Rear foot fastening screw C
⑮-3 Rear foot fastening screw A
⑮-4 Rear foot fastening screw B
⑯ Stripe adjuster plate

14. Removing the right and left intarsia rasing cams and the operation plate for intarsia.

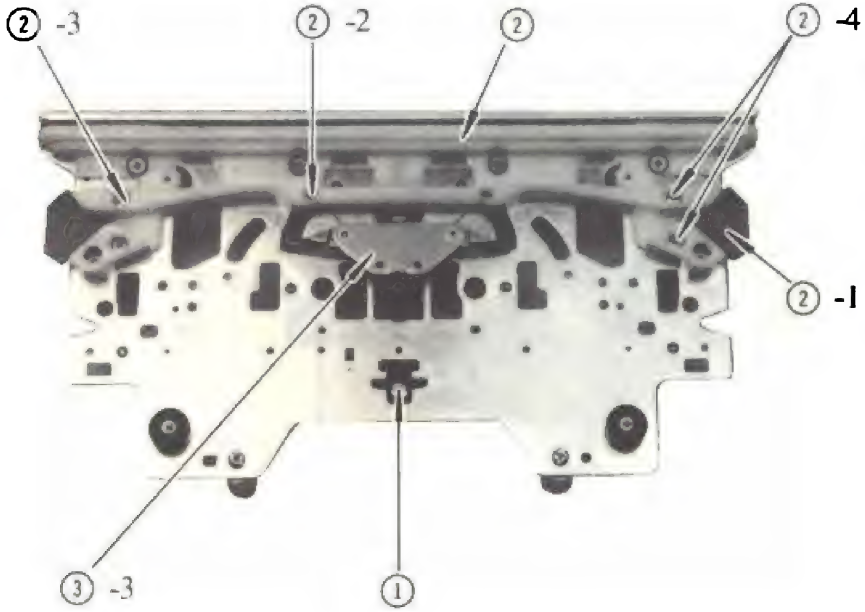
(1) Loosen the two guide cam, M fastening screws (flat head screws) and remove the guide cam, M.
(2) Remove the right and left intarsia rasing cams from the intarsia rasing cam shafts.
(3) Remove the right and left springs for intarsia rasing cam from the intarsia rasing cam shafts.
(4) Remove the operation plate for intarsia from the rear foot.

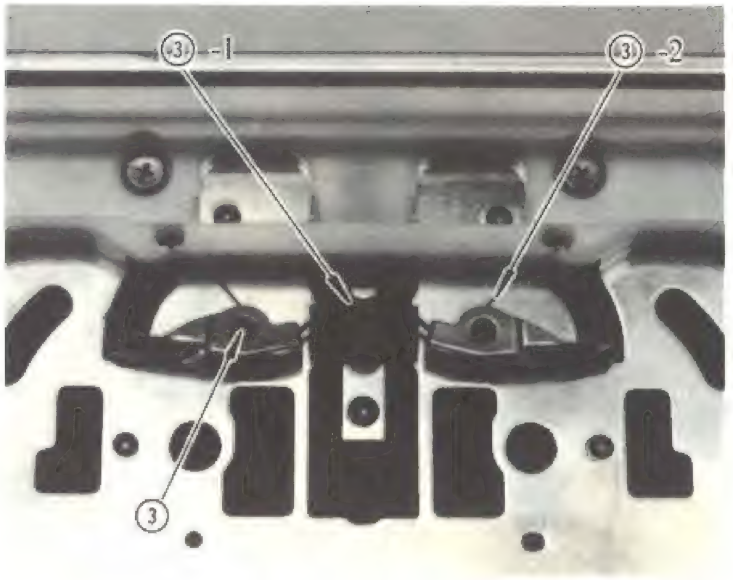
15. Removing the rear foot and the right and left guide cams

(1) Loosen the four rear foot fastening screws C and remove the right and left guide cams.
(2) Loosen the two rear foot fastening screws A and the four screws B and remove the rear foot.

16. Removing the stripe adjuster plate

Loosen the stripe adjuster plate fastening screw and remove the stripe adjuster plate.





Names of parts

① Stripe adjuster plate
② Rear foot
②-1 Guide cam
②-2 Rear foot fastening screw A
②-3 Rear foot fastening screw B
②-4 Rear foot fastening screw C
③ Intarsia rasing cam
③-1 Operation plate for intarsia
③-2 Spring for intarsia rasing cam
③-3 Guide cam, M

1. Mounting the stripe adjuster plate

Clamp the stripe adjuster plate with the stripe adjuster plate fastening screw provisionally.

* **Secure the plate after the adjustement of fitting measurement of the stitch cams.**

2. Mounting the rear foot and the right and left guide cams

(1) Fit the rear foot with the two rear foot fastening screws A and the four rear foot fastening screws.

(2) Mount the right and left guide cams with the four rear foot fastening screws C.

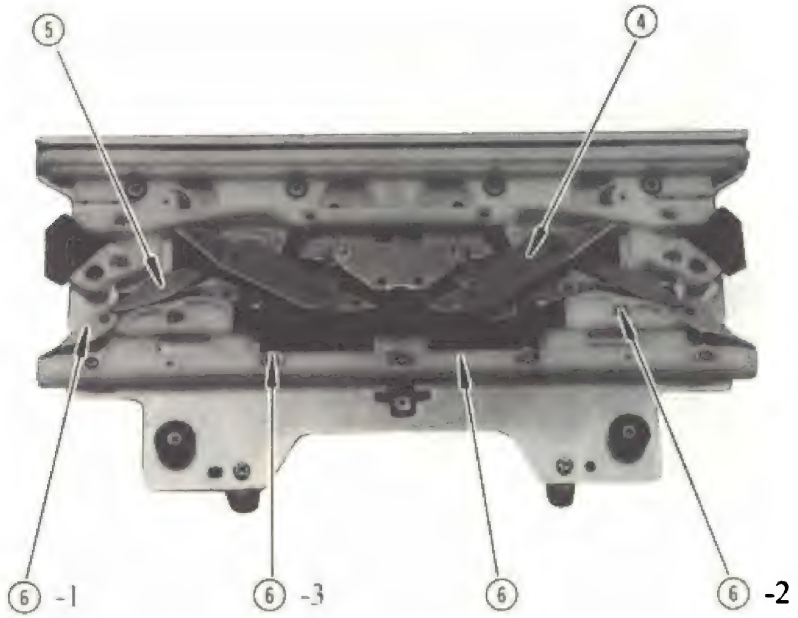
3. Mounting the right and left intarsia rasing cams and the operation plate for intarsia

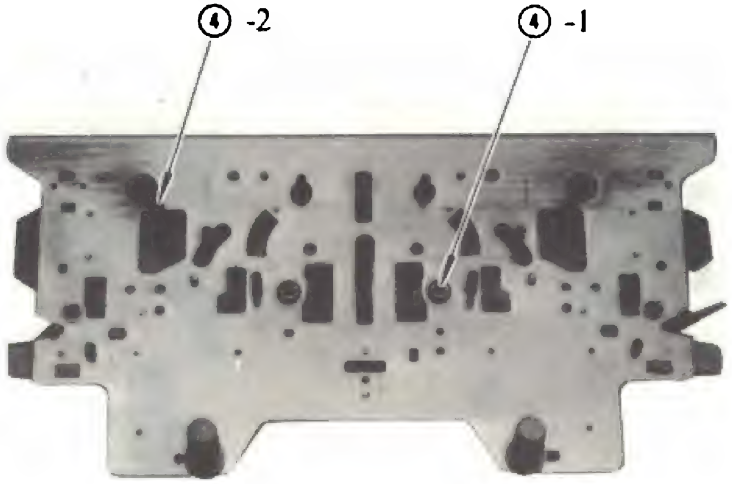
(1) Mount the operation plate for intarsia onto the rear foot and fit a spring for intarsia rasing cam onto the rear foot to attach the right and left springs for intarsia rasing cam to the intarsia rasing cam shafts.

(2) Hook the springs for intarsia rasing cam over the intarsia rasing cams and mount the right and left intarsia rasing cams onto the intarsia rasing cam shafts.

(3) Attach the guide cam, M with the two guide cam fastening screws (flat head).

* **Make certain that the right and left intarsia rasing cams return with springs.**





Names of parts

④ Stitch cam
④-1 Snap ring 3
④-2 Rasing cam change spring
⑤ Intarsia knitting cam
⑥ Front foot
⑥-1 Holding cam
⑥-1 Front foot fastening screw A
⑥-2 Front foot fastening screw B

4. Mounting the right and left stitch cams

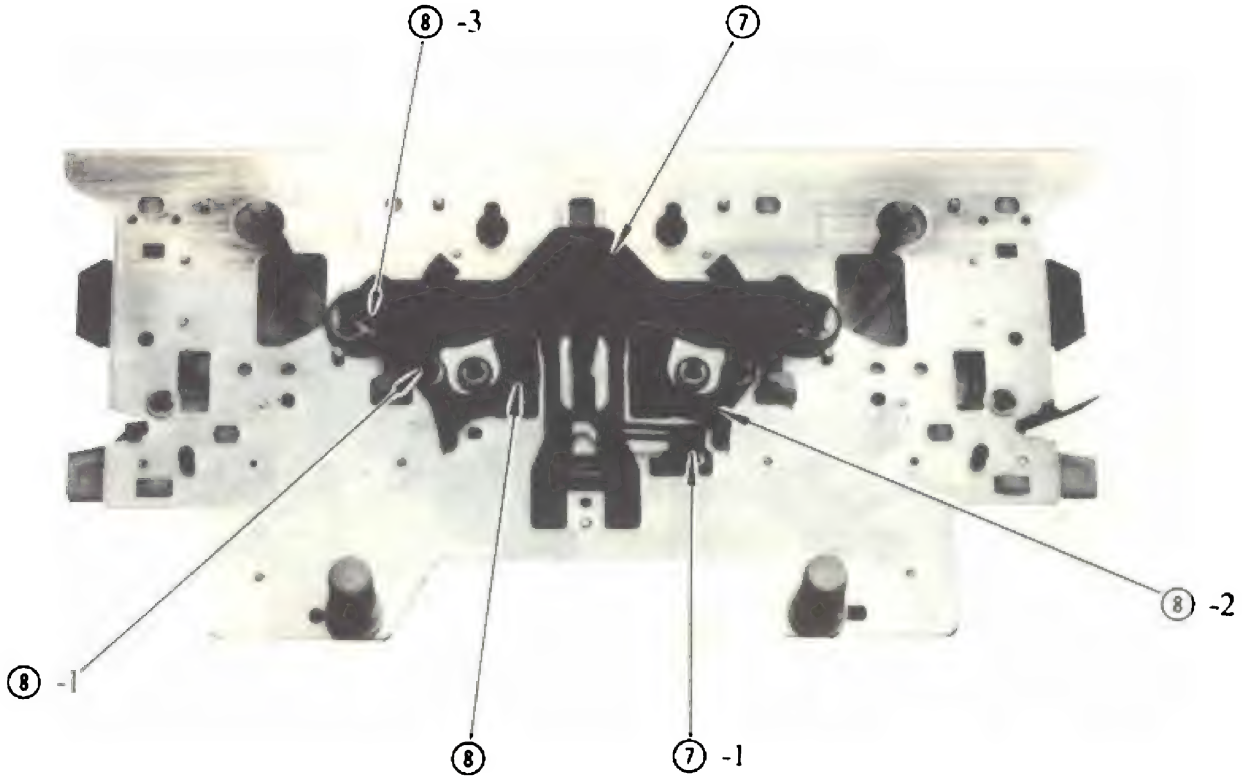
(1) Mount the right and left stitch cams onto the carriage plate.
(2) Fit the right and left stitch cams with the snap rings (A7) from the carriage front side.
(3) Hook the right and left rasing cam change springs over the rasing cam shafts and the rear foot from the carriage front side.

5. Mounting the right and left intarsia knitting cams

Mount the right and left intarsia knitting cam with the intarsia knitting cam fastening screws (stud screws)

6. Mounting the front foot and the right and left holding cams

(1) Mount the front foot with the two front foot fastening screws A and the five front foot fastening screws B.
(2) Fit the right and left holding cams onto the holding cam shafts and mount the cams with the snap rings (A45).



Names of parts

- ⑦ Stitch cam guide plate
- ⑦-1 Stitch dial notch spring
- ⑧ Sub rasing cam change plate
- ⑧-1 Sub change spring
- ⑧-2 Spring for sub rasing cam
- ⑧-3 Stitch cam guide plate spring

7. Mounting the stitch cam guide palte

(1) Fit the stitch cam guide plate onto the stripe adjuster plate and the stitch dial and stitch cam shafts.

(2) Attach the washers (A3) and the snap rings (A4) to the stitch cam guide plate shafts to fix the stitch cam guide plate.

(3) Attach the stitch dial notch spring with the stitch dial notch spring fastening screw.

* **Make certain that the stitch cam guide plate works smoothly.**
* **Adjust the fitting measurement of the right and left stitch cams and secure the stripe adjuster plate fastening screw which is provisionally tightened. (See the page 20.)**

8. Mounting the right and left sub rasing cam change plates

(1) Fit the right and left sub rasing cam change plates onto the sub rasing cam change plate shafts to fix them with the washers (A21) and the snap rings (A22).

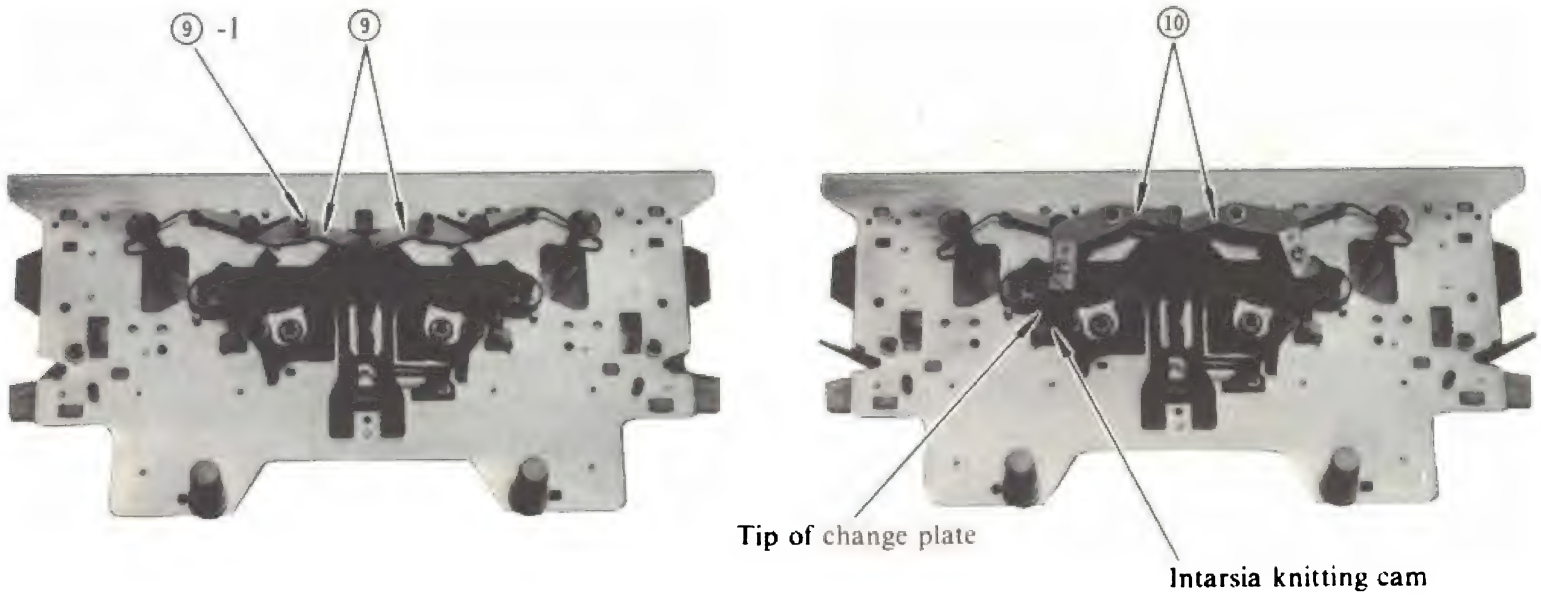
(2) Hook the right and left sub change springs over the sub rasing cam change plate and the front foot and mount the right and left sub change springs with the snap rings (A25).

* **Take care not to mistake the spring direction.**

(3) Hook the right and left springs for sub rasing cam over the sub rasing cam change plates and the sub rasing cams.

(4) Hook the right and left stitch cam guide plate spirngs over the sub rasing cam change plate shafts and the stitch cam guide palte shafts.

* **Take care not to straighten the hook of the spring.**
* **Make certain that the right and left sub rasing cam change plates work smoothly.**



Names of parts

⑨ Rasing cam change plate
⑨-1 Spacer
⑩ Shift lever for intarsia

9. Mounting the right and left rasing cam change plates

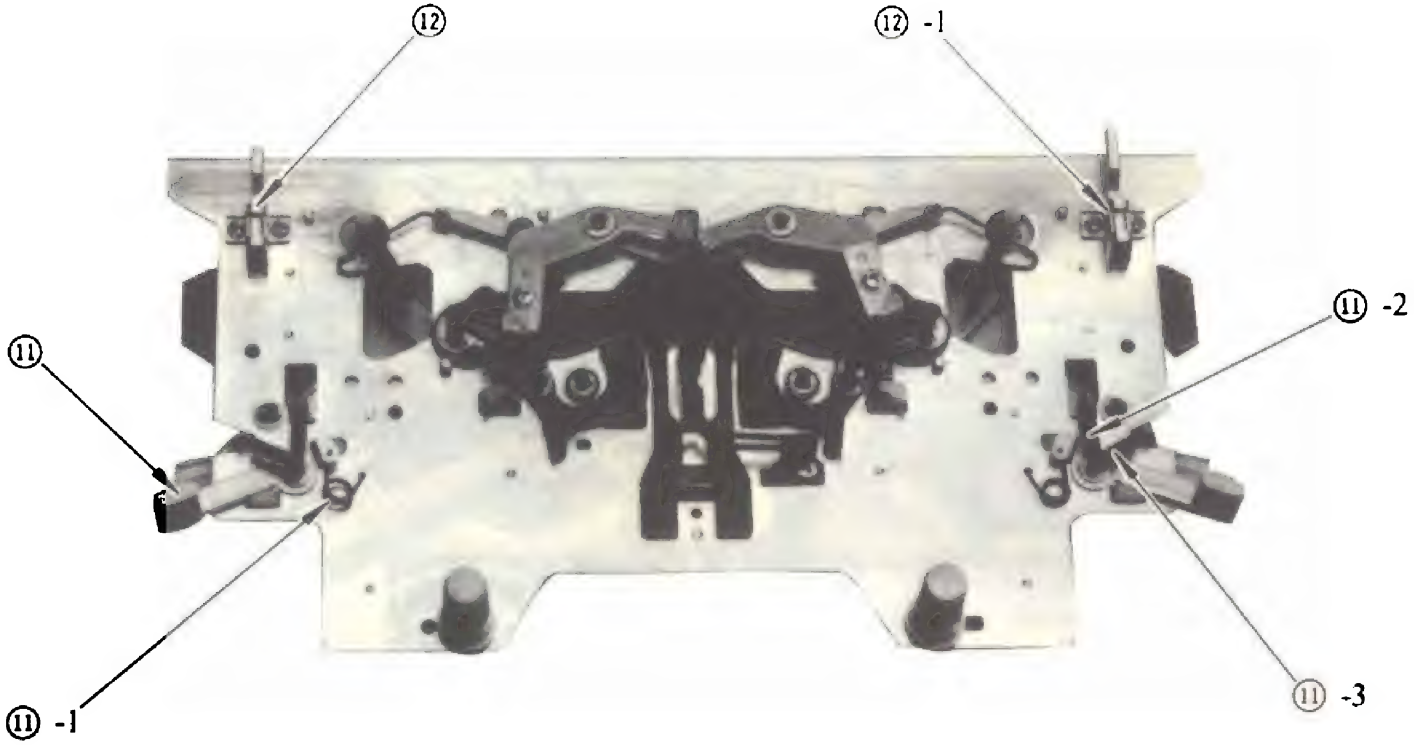
(1) Mount the right and left rasing cam change plates onto the rasing cam change plate shafts.

(2) Attache the two spacers onto the rasing cam change plate shafts.

10. Mounting the right and left shift levers for intarsia

Mount the right and left shift levers for intarsia onto the rasing cam change plate shafts with the washers (A17) and the snap rings (A18).

*** Take care not to confuse the right shift lever for intarsia with the left one and also not to mistake the mounting position of the intarsia knitting cam.**



Names of parts

- ⑪ Holding cam lever
- ⑪-1 H.C.L. spring
- ⑪-2 Intarsia knitting cam spring
- ⑪-3 Holding cam spring
- ⑫ Row counter tripper

11. Mounting the right and left holding cam levers

(1) Fit the right and left holding cam levers and the right and left HC.L. springs onto the holding lever shafts and the carriage plate.

(2) Mount the right and left holding cam levers onto the holding cam lever shafts with the washers (A40) and the snap rings (A41).

(3) Hook the right and left intarsia knitting cam springs (long springs) over the intarsia knitting cams and the holding cam lever shafts.

(4) Hook the right and left holding cam springs (short springs) over the holding cams and the holding cam lever shafts.

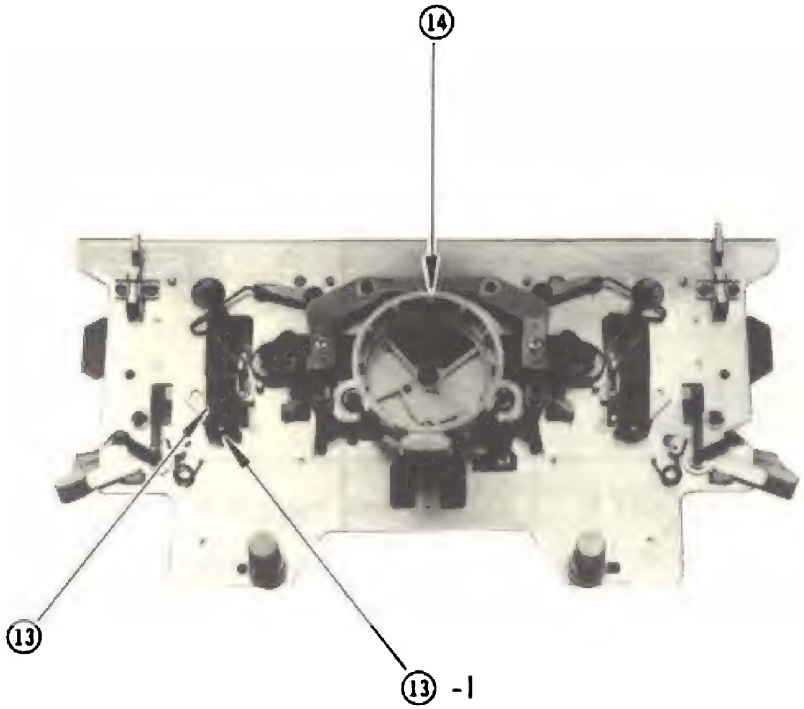
* **Take care not to confuse the intarsia knitting cam spring with the holding cam spring.**
* **Make certain that the right and left intarsia knitting cams and the right and left holding cams return with springs.**
* **Make certain that the right and left holding cam levers work smoothly.**

12. Mounting the knit-leader tripper and the row counter tripper

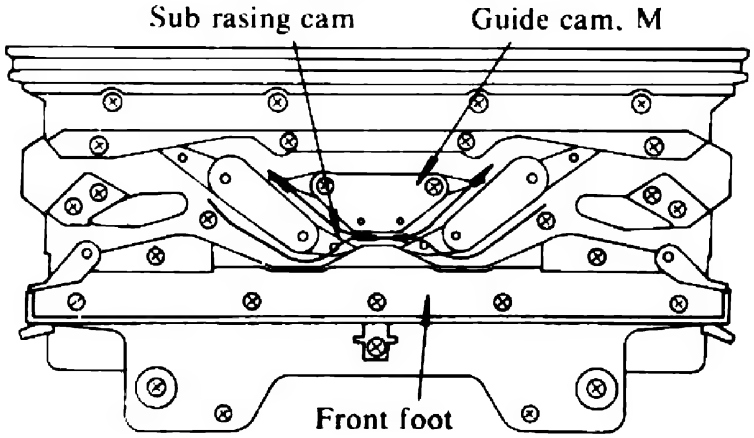
(1) Mount the knit-leader tripper (small tripper) with the two knit-leader tripper fastening screws with the row counter tripper spring placed under the knit-leader tripper.

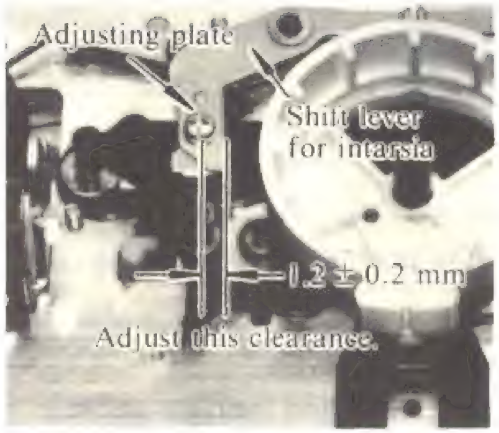
(2) Mount the row counter tripper (big tripper) with the two row counter tripper fastening screws with the row counter tripper spring placed under the row counter tripper.

* **Make certain that the knit-leader tripper and the row counter tripper work smoothly.**



Adjustment of the right and left shift levers for intarsia





Names of parts

⑬ Handle setting base
⑬-1 Handle lock spring
⑭ Pattern selector lever

13. Mounting the right and left handle setting bases

(1) Mount the right and left handle setting bases with the handle setting base fastening screws

(2) Mount the right and left handle lock springs with the handle lock spring fastening screws.

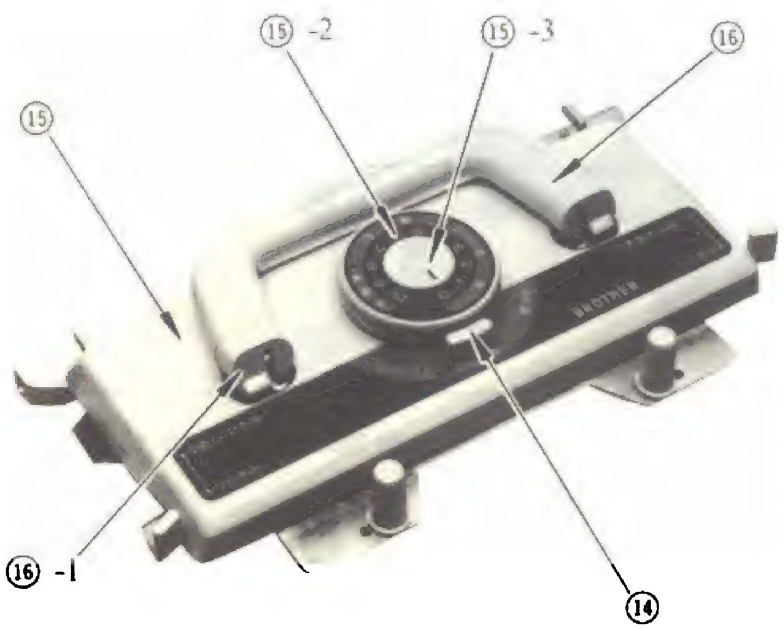
14. Mounting the pattern selector lever

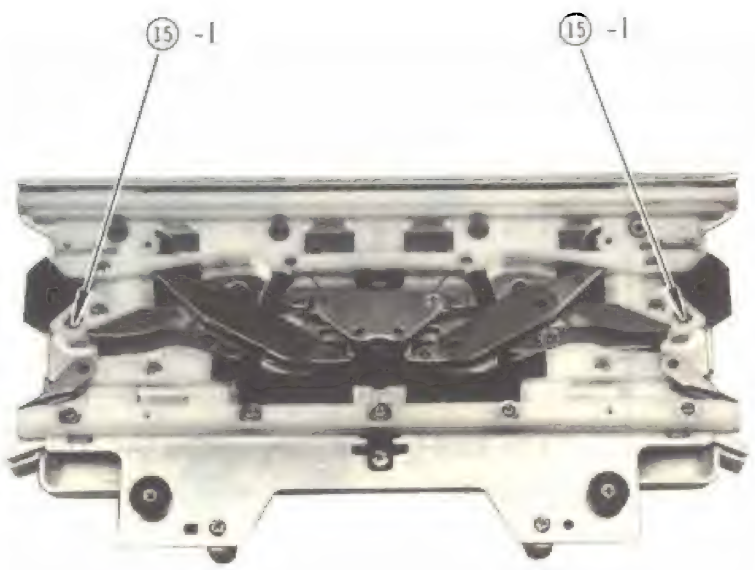
Fit the pattern selector lever onto the stitch dial shaft by holding its periphery and set it by turning in the arrow direction — from the 'PART' to 'PLAIN' position

Adjustment of the right and left shift levers for intarsia

① Make certain that the needle butts pass between the sub rasing cam and guide cam, M and the front foot smoothly.

② If needle butts do not pass smoothly, loosen the adjusting plate fastening screws so that the clearance between the adjusting plate and the shift lever for intarsia may be 1.2 $^{m}_{m}$.





Names of parts

⑭ Pattern selector lever
⑮ Carriage cover
⑮-1 Carriage cover fastening screw
⑮-2 Stitch dial
⑮-3 Stitch dial cap
⑯ Handle
⑯-1 Screw

15. Mounting the carriage cover

(1) Fit the carriage cover with the pattern selector lever set to the 'PLAIN' position and mount the carriage cover with the two carriage cover fastening screws (tapping screws).
(2) Fit the stitch dial onto the stitch dial shaft and mount the stitch dial presser with the notch located frontward with the stitch dial presser fastening screw.
(3) Mount the stitch dial cap onto the stitch dial presser, matching the mark on the cap to the notch of the presser.

16. Mounting the carriage handle

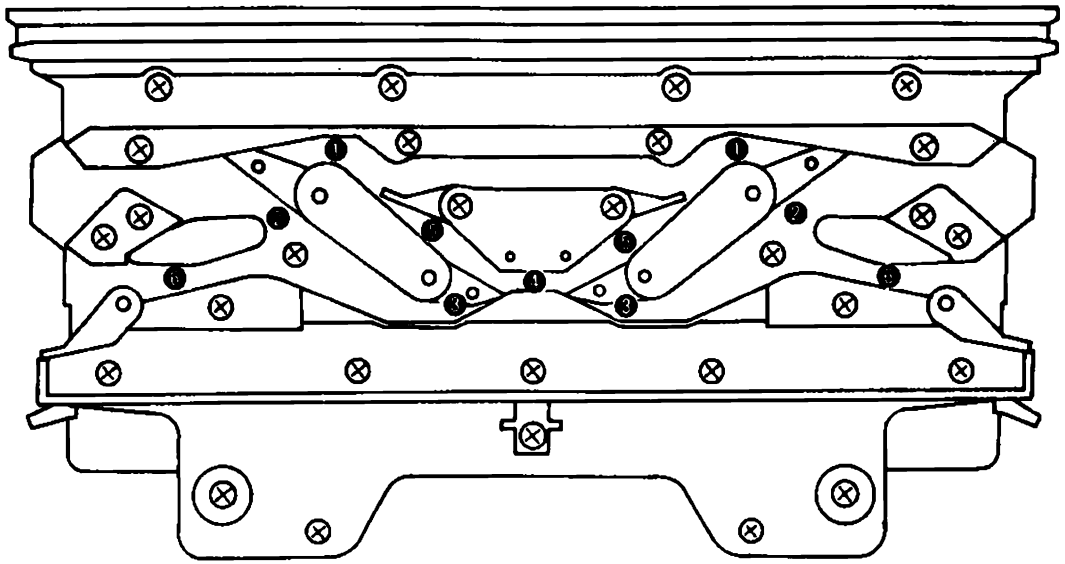
Keep the carriage handle down and mount it with the two handle pins (two screws).

3. CHECKING THE CARRIAGE FUNCTIONS

(1) CHEKING THE CARRIAGE FUCNTIONS [1]

① **Pattern selector lever (pattern lever)**	* The pattern selector lever should smoothly be turned to the following positions; the 'INTARSIA', 'PLAIN', and 'PART' positions. The intarsia knitting cams, R and L, the sub rasing cams, R and L, the intarsia rasing cams, R and L, and the rasing cams, R and L should work certainly.
② **Stitch dial**	* The stitch dial should be turned from 0 to 10 smoothly.
③ **Knit-leader tripper and row counter tripper**	* The knit-leader tripper and the row counter tripper should change over from 'funciotn' to 'non-function' smoothly.
④ **Holding cam lever**	* The holding cam lever should change over from 'HOLDING' to 'NORMAL' smoothly and the holding cam should change over certainly,
⑤ **Holding cam**	* The holding cam certainly returns with the spring while the holding cam lever is turned to the 'NORMAL' position.
⑥ **Intarsia knitting cam** ⑦ **Sub rasing cam** ⑧ **Rasing cam** ⑨ **Intarsia rasing cam**	* The intarsia knitting cam, sub rasing cam, rasing cam, and intarsia rasing cam certainly return with the springs while the pattern selector lever is turned to the 'PLAIN' position.

(2) CHECKING THE CARRIAGE FUNCTIONS [2]

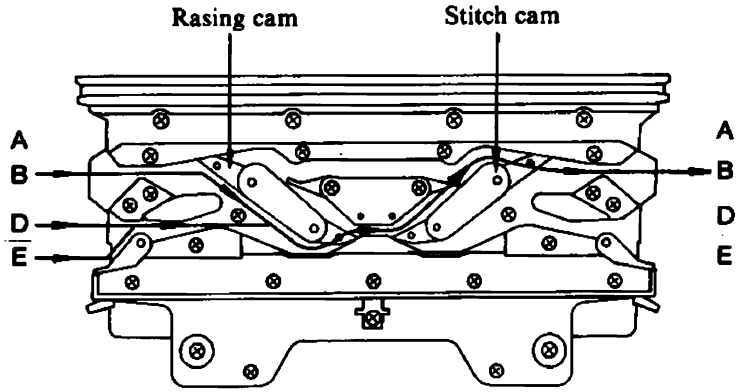


*** Make certain that the needle butts smoothly pass through the following clearances.**

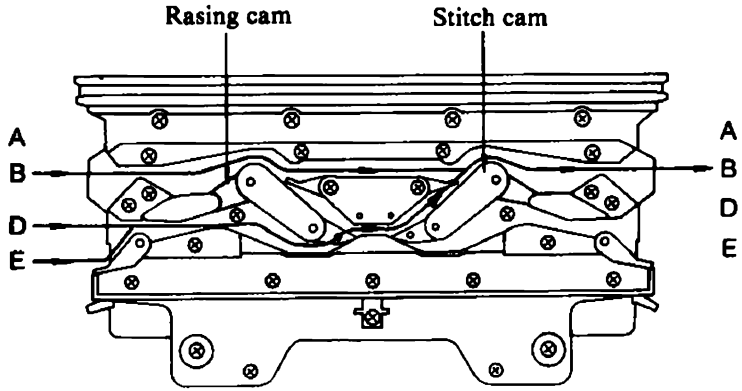
- ❶ Clearance between the rear foot and the stitch cam when the stitch dial is turned to 10 and the pattern selector lever to the 'PLAIN' position.
- ❷ Clearance between the intarsia knitting cam and the rasing cam when the stitch dial is turned to 0 and the pattern selector lever to the 'PLAIN' position.
- ❸ Clearance between the guide cam (front foot) and the sub rasing cam when the pattern selector lever is turned to the 'PLAIN' and 'PART' position.
- ❹ Clearance between the guide cam (front foot) and the guide cam, M.
- ❺ Clearance between the stitch cam and the guide cam, M when the pattern selector lever is turned to the 'PLAIN' and 'PART' position.
- ❻ Clearance between the intarsia knitting cam and the front foot when the pattern selector lever is turned to the 'PLAIN' position.

[Reference] In knitting, needle butts pass through the following paths.

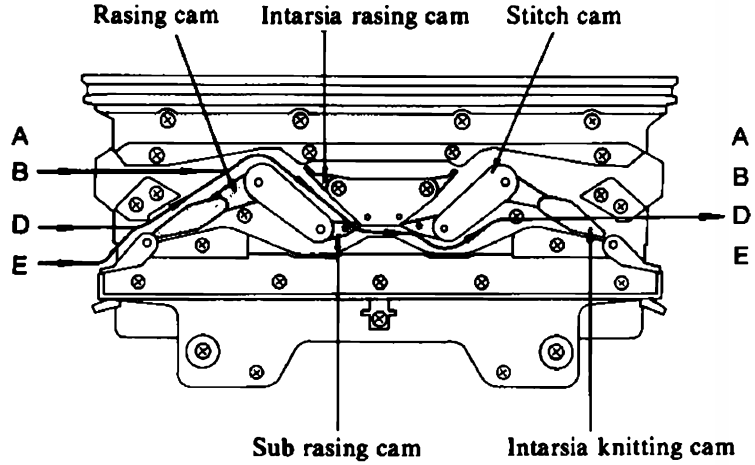
① Plain stitch (Pattern selector lever ... 'PLAIN', Holding cam lever ... 'N')



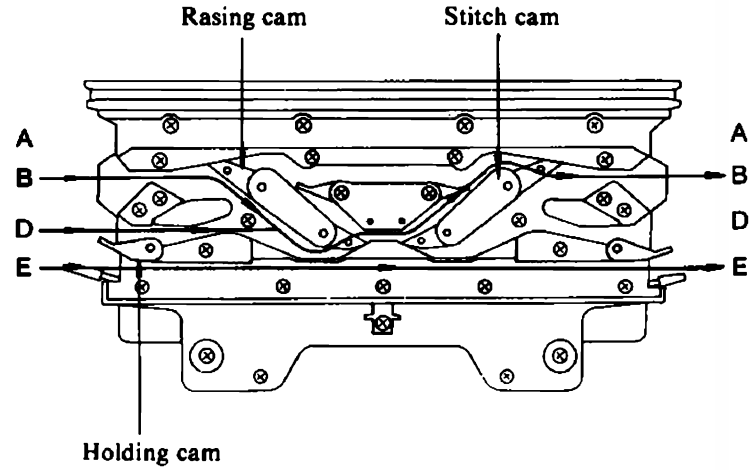
② Skip stitch (Pattern selector lever ... 'PART', Holding cam lever ... 'N')

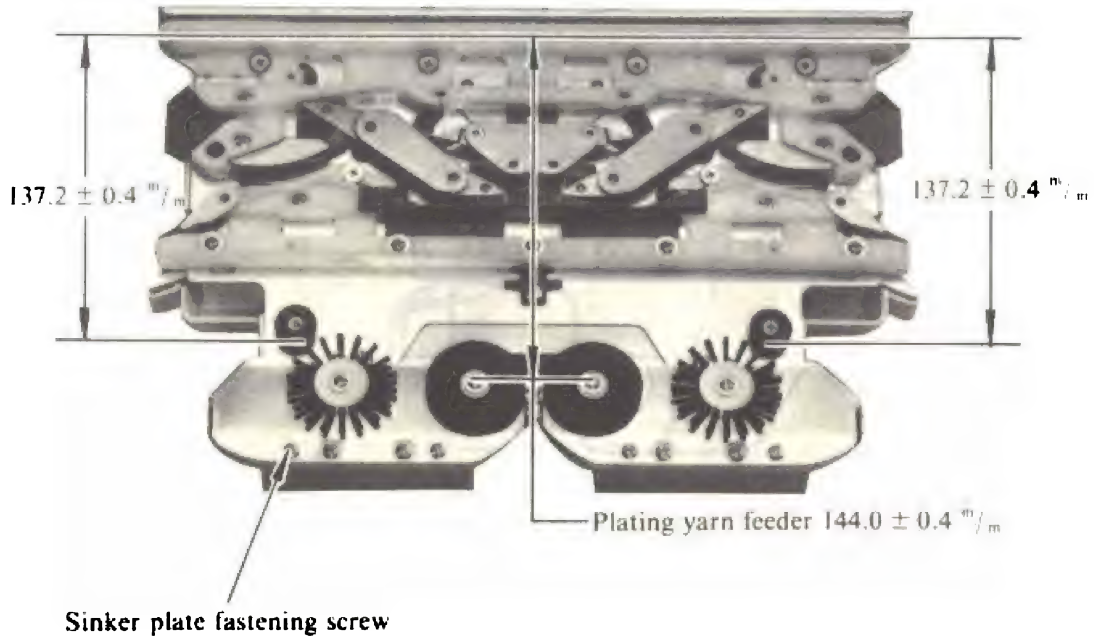


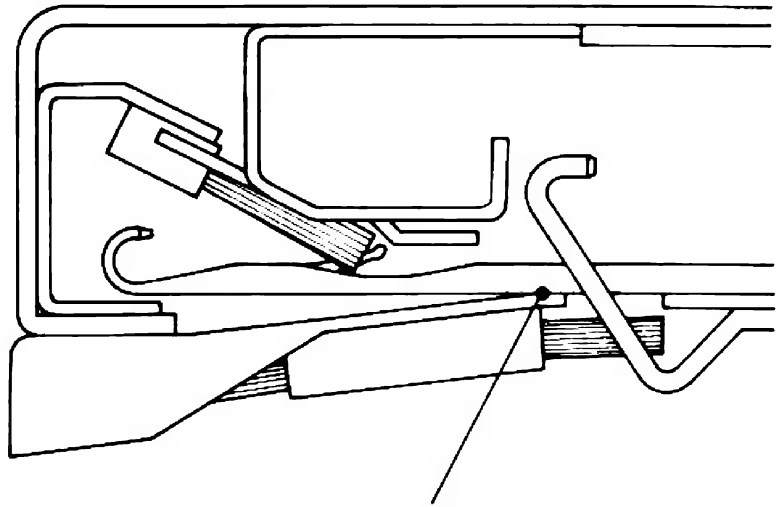
③ Intarsia stitch (Pattern selector lever ... 'INTAR' (INTARSIA), Holding cam lever ... 'N')



④ Holding stitch (Pattern selector lever ... 'PLAIN', Holding cam lever ... 'H')







*** The stem of the needle should lightly contact with the sinker plate.**

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1. Position adjustment of the sinker plate

The standard dimension from the rear foot and the sinker plate is 137.2 m/m. If necessary, loosen the four right and left sinker plate fastening screws to adjust the sinker plate.

[Reference] Clearance between the sinker plate and the needle bed comb ... 1.2 m/m

2. Mounting dimensions of plating yarn feeder

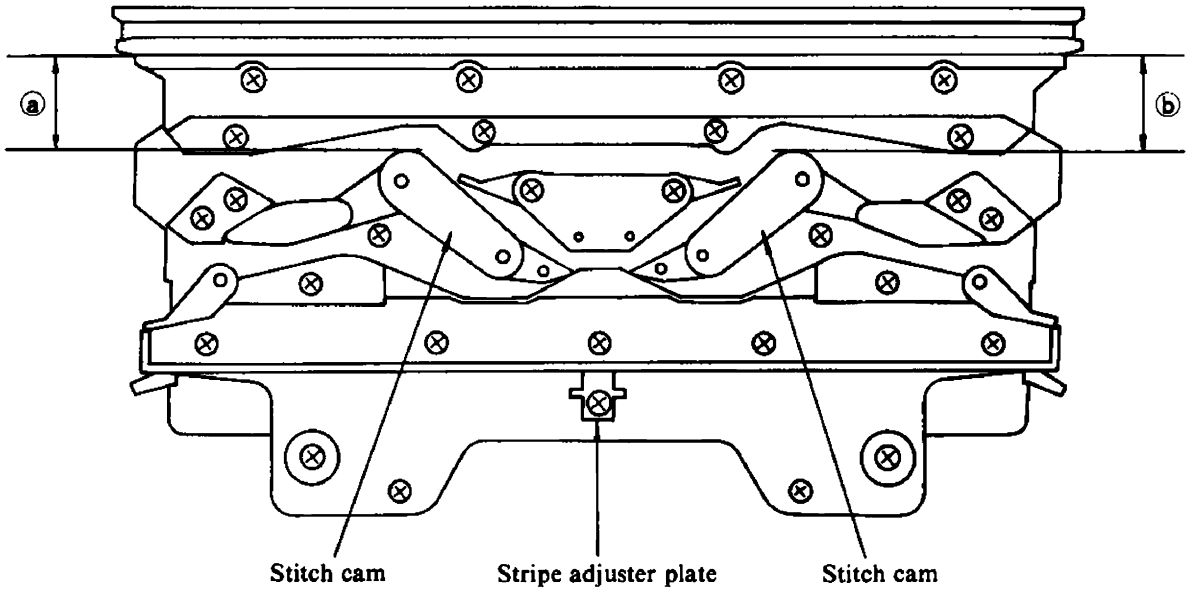
The standard dimension from the rear foot to the plating yarn feeder is 144.0 m/m. If necessary, loosen the two plating yarn feeder fastening screws (flat head screws) to adjust the plating yarn feeder.

3. Vertical adjustment of the sinker plate and the plating yarn feeder

(1) Fit the carriage to the needle bed and set the holding cam lever to the 'H' position.

(2) Set some five needles to the E position at the center and the right and left ends of the needle bed.

(3) Adjust to bend the sinker plate so that the stem of the needle may lightly contact with the sinker plate.



4. Adjustment of the stitch cam fitting measurements (stripe adjuster plate)

(1) Set the pattern selector lever to the 'PART' position.

(2) Loosen the stirpe adjuster plate fastening screw.

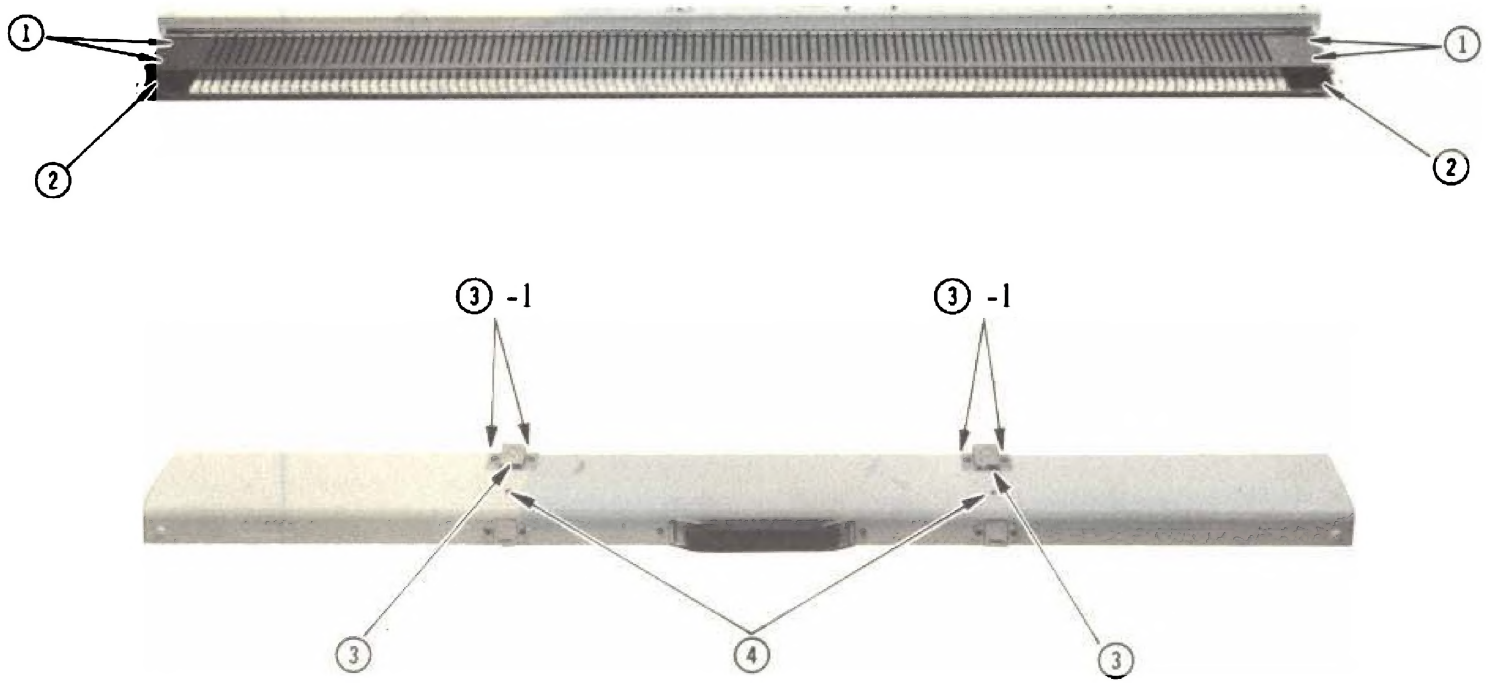
(3) Make the stitch cam fitting a and b of the right and left stitch cams uniform with slide calipers by moving the stripe adjuster plate.

(4) Tighten the stripe adjuster plate fastening screw.

* **The difference in the stitch cam fitting a and b of the right and left stitch cams should be within 0.35 $^{m}/_{m}$.**
[Reference] Stitch cam fitting of the stitch cam with the stitch dial set to ⑤ ... 30.5 $^{m}/_{m}$

* **After the adjustment, be sure to check by knitting plain stitch with very thick yarn with the stitch dial set to ⑤.**

1. DISASSEMBLING THE MACHINE BODY

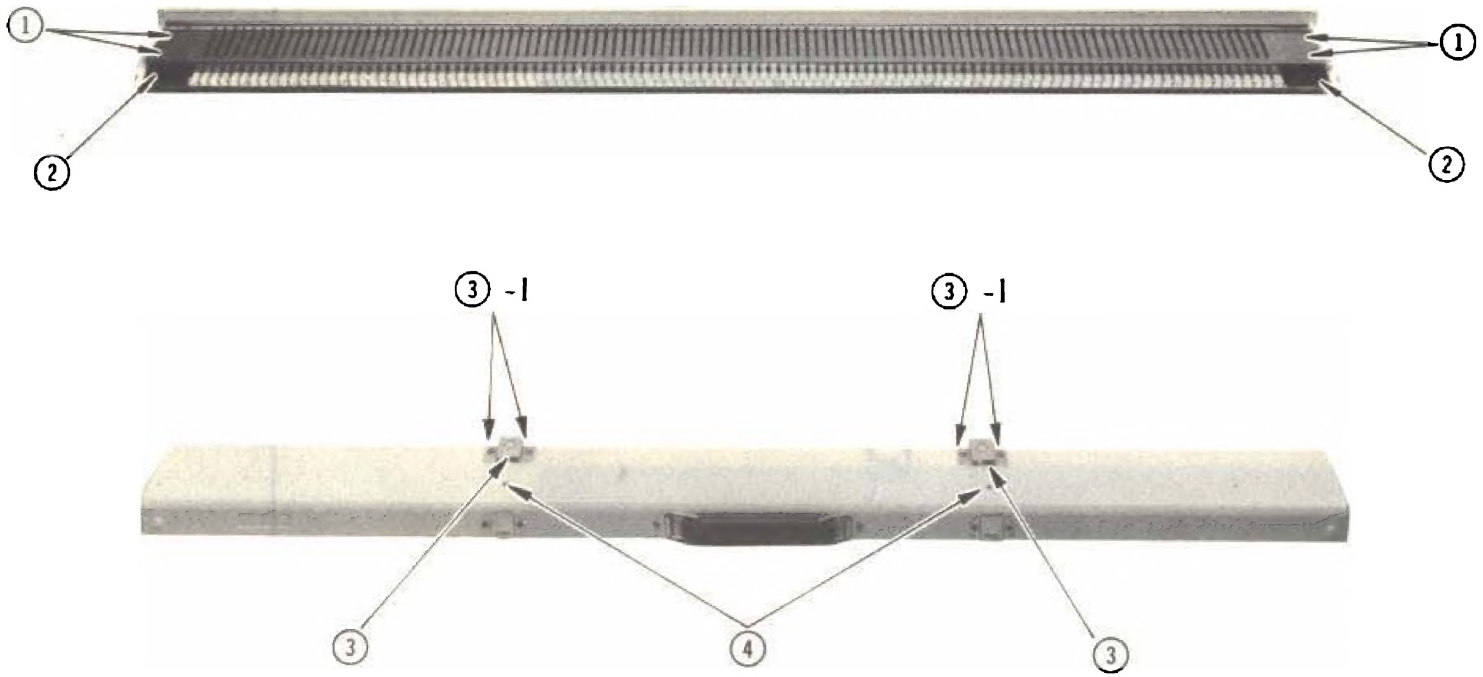


Names of parts

① Needle bed fastening screw
② Needle bed front fastening screw
③ Table clamp setting plate
③-1 Table clamp setting plate fastening screw
④ Stay fastening screw

1. **Loosen the four right and left needle bed fastening screws.**
2. **Loosen the right and left needle bed front fastening screws.**
3. **Turn over the machine body to loosen the four right and left table clamp setting plate fastening screws and remove the right and left table clamp setting plates.**
4. **Loosen the two stay fastening screws.**
5. **Take the machine body out of the carrying case.**

2. ASSEMBLING THE BODY

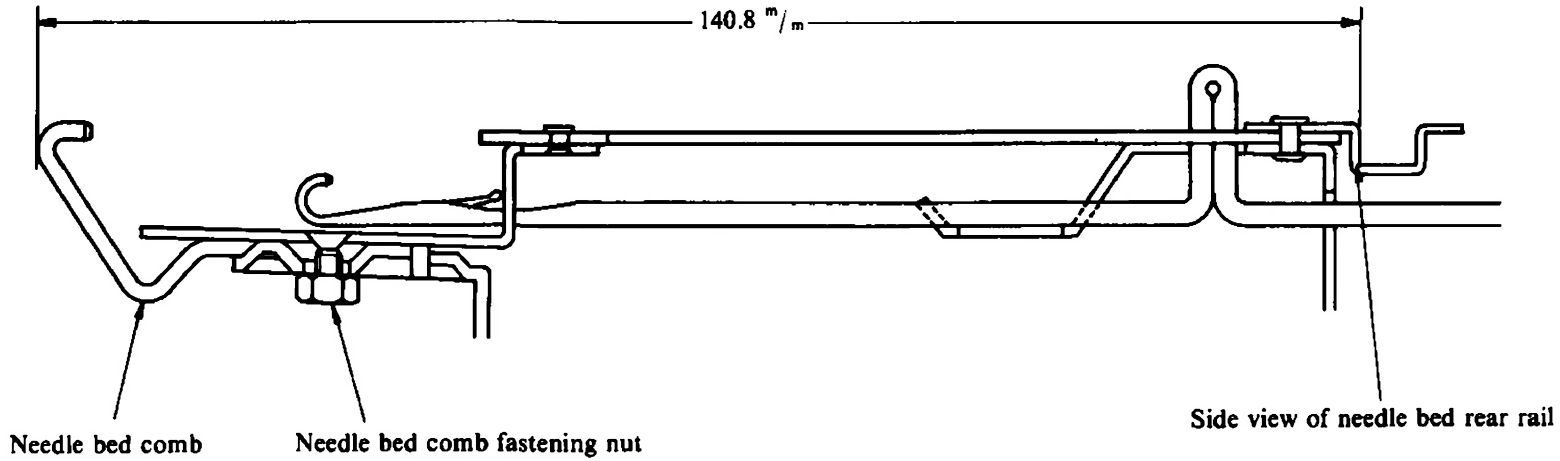


Names of parts

- ① Needle bed fastening screw
- ② Needle bed front fastening screw
- ③ Table clamp setting plate
- ③-I Table clamp setting plate fastening screw
- ④ Stay fastening screw

1. **Set the needle of the machine body to the E position and fit the rear rail part of the machine body onto the tail end of the carrying case.**
2. **Tighten the four right and left needle bed fastening screws.**
3. **Tighten the two right and left needle front bed fastening screws.**
4. **Turn over the machine body to fit the higher part of the table clamp setting plate to the needle bed comb side. Tighten the four right and left table clamp setting plate fastening screws and mount the right and left table clamp setting plates.**
5. **Tighten the two stay fastening screws.**

3. ADJUSTING THE MACHINE BODY



Adjustment of the fitting measurements of the needle bed comb

(1) Take the machine body out of the carrying case. (See the page 21.)

(2) Loosen the 15 fastening nuts located on the back of the needle bed comb with a box wrench.

(3) Set some three needles to the E position at the center and the right and left ends of the needle bed. And position the needle bed comb so that the needles may locate in the middle of the needle bed comb. (Right and left adjustment)

(4) Adjust the fitting measurements of the needle bed comb (the distance from the needle bed rear rail to the needle bed comb) to be 140.8 m/m and tighten the nuts. (Front and rear adjustment)

***Take care not to tighten the nuts excessively. Nuts might be damaged.**